

THE LIFE HISTORY OF *ARHOPALA WILDEI WILDEI* MISKIN (LEPIDOPTERA: LYCAENIDAE)

A.J. KING¹ and L.R. RING²

¹GPO Box 1302, Townsville, Qld 4810

²C/- Malacca Butterfly and Reptile Sanctuary, Ayer Keroh, 75450 Melaka, Malaysia

Abstract

The life history of *Arhopala wildei wildei* Miskin is described and notes presented on its biology and behaviour. *A. w. wildei* larvae were observed to be myrmecophagous and confined within nests of the arboreal ant *Polyrhachis queenslandica* Emery (Hymenoptera: Formicidae: Formicinae).

Introduction

Four species of *Arhopala* Boisduval occur in Australia, distributed from northern Western Australia to Cape York and then south to Tannum Sands in south eastern Queensland (Hacobian 1992). *A. w. wildei* Miskin has been recorded from Cape York south to Conn Creek, south of Cardwell (Braby and Dunn 1991) and has been collected at Kuranda in highland vine forest near the Barron River (J. Olive coll.). *A. w. wildei* adults have been observed on occasions to be locally common. With the exception of *A. w. wildei* all Australian representatives of the genus are phytophagous with both larvae and pupae being attended by the green tree ant *Oecophylla smaragdina* Fabricius (Formicidae) but apparently not dependant on the ants for survival.

The genus *Polyrhachis* F. Smith contains at least 114 Australian species, both arboreal and terrestrial, with the known distribution of *P. queenslandica* Emery extending from just north of Townsville to Cape York and in the Northern Territory around Darwin (R. Kohout pers. comm.). *P. queenslandica* ants build arboreal nests by joining together the edges of overlapping leaves with dried plant fragments and silk.

Life History

Egg (Figs 1, 2) 1.0 mm wide and 0.3 mm high, bluish white fading to white, circular, very flattened, slightly domed on both sides with a prominent micropylar depression at top centre. The upper middle surface is covered in small, evenly spaced and slightly raised domes, each with an irregularly rounded central depression, which transform into a narrow band of short, uneven and somewhat pointed projections around the circumference. The egg has no ridges either radiating or oblique.

First Instar Larva. 2.0 mm long, translucent white with the head pale brown and a dark patch visible under the prothoracic plate. Numerous fine, long translucent setae are present on the upper head and forward edge of the prothoracic plate. Sparse, short, pointed and appressed translucent setae are present on the dorsal surface.

Third Instar Larva. 5.0 mm long, translucent white and flattened with a pink suffusion developing on the mid-dorsal surface. An obscure median dorsal



Figs 1-4. *Arhopala wildei wildei*. (1) egg; (2) eggs on nest wall; (3, 4) lateral and dorsal views of mature larva.



Fig. 5. *Arhopala wildei wildei*, pupa in nest.

organ is visible on the seventh abdominal segment. The head is yellow-brown and the spiracles are black.

Mature Larva (Figs 3, 4) 18.0 to 20.0 mm long and 5.0 mm wide; dorsal surface flattened, prothoracic plate rounded, convex and hoodlike with the forward edge raised and thickened. From the prothoracic plate to abdominal segment eight, segment divisions conspicuous with the dorsolateral margin extended and becoming raised towards the posterior. A large, ovoid, median dorsal organ edged in brown and with a prominent transverse slit is present on the seventh abdominal segment; segments eight and nine narrowing and sloping into a deeply concave anal plate on segment ten. A conspicuous lateral fringe of long translucent setae runs the entire length of the body. Mature larvae are white to cream with the head pale yellow, the spiracles edged orange-brown and the mid-dorsal vessel visible as a thin brown pulsating line. The larvae were not observed to have tentacular organs present.

Pupa (Fig. 5) 16.0 to 18.0 mm long and 6.0 mm wide, slightly humped and widest at the mid-section with the abdominal segments narrowing to an elongated anal disc. Pupae are dull light brown with a darker brown thorax and the spiracles are obscure. They are attached to a pad of silk by anal hooks and a silken girdle inside the ants' nest.

Observations

A. w. wildei females were observed to lay one to three eggs at a time on *P. queenslandica* nests with the eggs usually laid on the nest wall or occasionally on leaves proximal to the nest entrance. *A. w. wildei* eggs

visible on *P. queenslandica* nests graduated from pale blue to white and intact, through white to grey empty shells, to black fragments embedded in the nest wall. Small *P. queenslandica* nests ($ca < 10\text{cm}^3$) attracted only one to three eggs while larger nests had many eggs laid in succession by a number of *A. w. wildei* females. One larger *P. queenslandica* nest ($ca 90\text{cm}^3$) had, attached to its side, 12 intact *A. w. wildei* eggs, 26 empty shells of various ages and an uncertain number of blackish egg fragments embedded in the nest wall. A small number of *A. w. wildei* eggs were occasionally found to be present on the arboreal nests of a physically similar species, *Polyrhachis yarrabahensis* Forel, but no later stages were found.

On emerging from the egg *A. w. wildei* larvae are carried by *P. queenslandica* ants into the nest and deposited near the ant brood where they are attended by numerous ants. Up to 15 *A. w. wildei* larvae of various instars were observed in large *P. queenslandica* nests and it was also noted that the larvae were often lined up side by side on the bottom of the nest. *A. w. wildei* larvae were observed to consume the contents of *P. queenslandica* eggs after which the cuticle was discarded. *P. queenslandica* ants were observed to attend the median dorsal organ of resident *A. w. wildei* larvae for exudates which at times was observed to accumulate in the concave anal depression. A number of *A. w. wildei* pupae observed in *P. queenslandica* nests in the wild were attached to a pad of silk on the nest wall by anal hooks and a silken girdle. On emergence *A. w. wildei* adults would have to pass the ants and exit the nest through the narrow access holes. No *A. w. wildei* adults were observed emerging from *P. queenslandica* nests in the wild.

Acknowledgments

We are indebted to Rudy Kohout of the Queensland Museum for identification of the ants, Mike Cermak of Townsville for photographs of the early stages, Peter Samson of Bundaberg for the photograph of the egg and to Rod Eastwood of Brisbane for helpful comments on the manuscript. Thanks also to Lance Veivers of Waugh's Pocket for allowing continued access to his property, making possible the discovery and observation of this remarkable life history.

References

- BRABY, M. F. and DUNN, K. L. 1991. Range extensions and distribution records for some butterflies from north-eastern Queensland. *Victorian Entomologist* 21: 62-66.
- HACOBIAN, B. S. 1992. New distribution records of the green tree ant *Oecophylla smaragdina* (Fabricius) (Hymenoptera: Formicidae: Formicinae) and three associated lycaenid butterflies. *Australian Entomological Magazine* 19: 111-113.
- KOHOUT, R. J. and TAYLOR, R. W. 1990. Notes on Australian ants of the genus *Polyrhachis* Fr. Smith, with a synonymic list of the species. (Hymenoptera: Formicidae: Formicinae). *Memoirs of the Queensland Museum* 28: 509-522.